Perspectives

Data visualization: Why a picture can be worth a thousand clicks

CFO Insights

In this issue of CFO Insights, we explore the multiple uses of data visualization and how finance can better leverage its possibilities.

Introduction

CFOs have long been encouraged to become better "storytellers," by communicating important messages about company performance, strategy, and prospects not in the often technical language of finance, but in terms everyone in the organization can understand.

At the same time, finance departments are working ever harder to become true partners to the business, by providing metrics, KPIs, forecasts, and other critical information that can aid decision-making and help each function chart effective courses of action.

Both of those goals depend heavily on quality data, and there is no doubt that organizations today have access to more of it than ever before, both structured and unstructured, from internal and external sources. And, thanks to an expanding array of analytics tools and emerging cognitive technologies, finance is also able to leverage that data to attain new insights that can influence a range of tactical and strategic decisions.

Data visualization: Why a picture can be worth a thousand clicks

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Insights, we'll explore the multiple uses of data visualization and how finance can better leverage its possibilities.

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The case for clarity

Anyone who has ever looked at a bar chart or glanced at a car's fuel gauge already gets data visualization. In fact, that's one of its prime selling points: It requires virtually no training, at least for end users. If a visualization has to be explained, odds are it's been poorly designed or insufficiently thought out.

For their part, CFOs could be forgiven for believing that the finance department already makes use of data visualization—given the number of charts in many organizational reports. But today the technology is being rolled out in new and more profound ways, helping to make more data more useful to more people.

Static field sales reports, for example, can now be sent as interactive dashboards designed for touch-screen use on mobile devices, giving salespeople a way to do on-the-fly analysis of maps showing them to spot areas ripe for additional marketing support, or a customer whose increasing volumes may merit a discount. At a more basic level, consider the value in creating charts that display data in a way the organization may not have thought of previously. One company, for example, developed a chart that displays growth in various product lines on the Y axis and margins on the X axis, allowing it to spot cases where low-margin products that it may have been tempted to invest little in were experiencing solid growth.

That same insight could have been arrived at via traditional scrutiny of tabular data, but as this example from the world of medical research—a field in which data analysis is, literally, a matter of life and death—demonstrates (see the infographic), sometimes a picture is worth a thousand data points:

Visualizing the eradication of the measles virus

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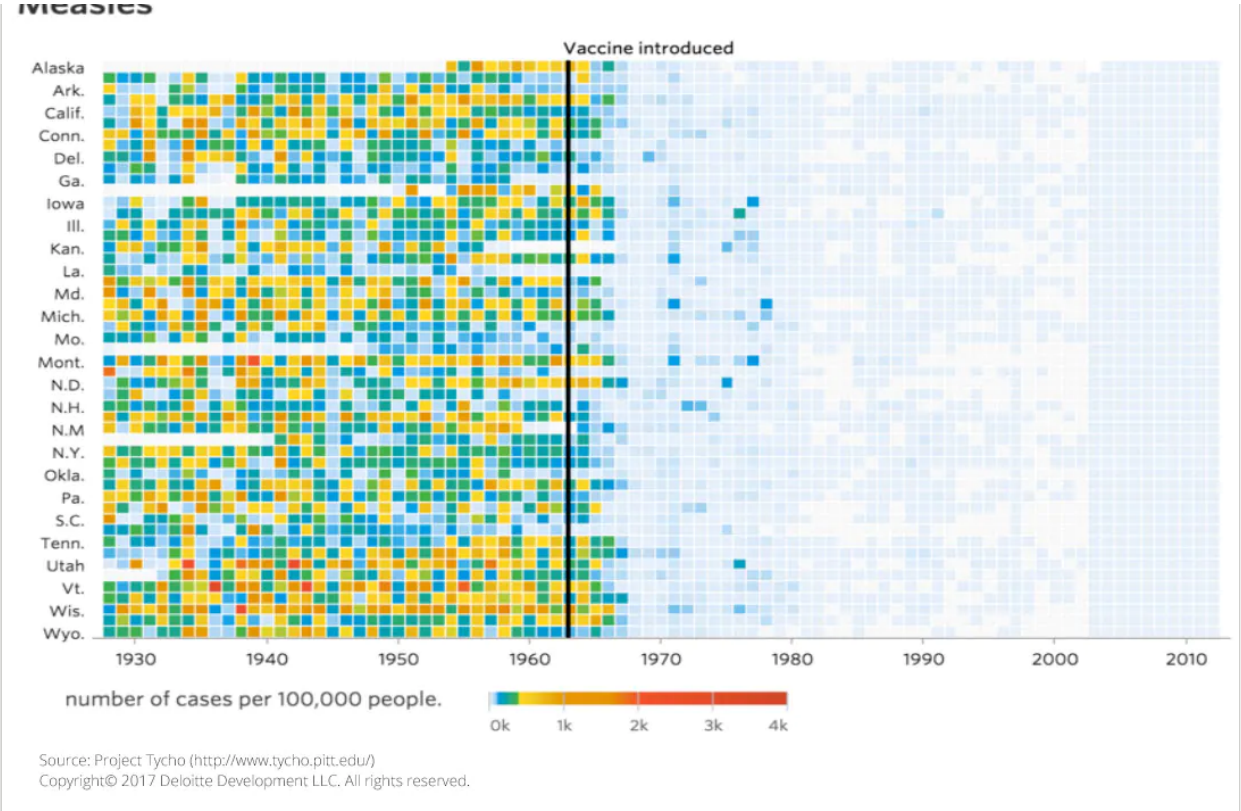

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Requires Adobe Reader

Source: Project Tycho (http://www.tycho.pitt.edu/)

The starkness of the before/after an impact of the measles vaccine captures the potential of data visualization and may serve as inspiration for organizations to consider how visualization can enhance or amplify cognition across finance, marketing, and many other functions. Data visualization can also be relatively inexpensive and may offer great "speed to value," with organizations often able to produce useful visualizations within a week or two of deploying an off-the-shelf tool.

Before evaluating the many data visualization products on the market, however, it's wise to take a step back and ask a few critical questions:

- Who is the audience, or audiences? What do they need the data for? How data–savvy are they?
- What do the various users need in terms of interactivity, mobile device usage, level of detail, and other design and interface requirements (which could get as detailed as the need to accommodate color–blindness).
- What is the desired outcome? How will it enhance decision–making, or drive better discussions, or better educate the end user?

With a specific user and need in mind, the next step is to create a basic design that can be modified as you develop a final version. Expect to work closely with users as you test and refine the visualization, particularly for more complex or interactive visualizations. For finance to become more adept at providing data in a highly visual form to different kinds of end users, it helps to define various "personas," or categories of users, because that can provide a foundation for defining the visualization that will be delivered. Some users may simply need access to a few specific metrics, perhaps delivered via a color-coded dashboard. For more sophisticated users who are performing data analysis, the intent of visualization may be to design a front end to various data sources that simplifies access to disparate systems and creates a more intuitive analytics interface.

Technologies at a glance

Whether in tandem with early design work or as a follow-on, another important step in most visualization projects will be to align the available technology to both the organizational vision and the specific audience needs. The field of visualization products is evolving at a fast pace, and there is increasing overlap. But as a general rule, today's offerings fall into three categories:

- Tools specifically designed to produce stunning visualizations, often with little (if any) training required. Vendors include Tableau, Qlik, and others. While products within this category do vary by capabilities and ease–of–use, they are generally quick to set up, can access data from multiple sources, and can be a simple way to begin to build departmental familiarity with visualization. In some cases, there are active online user communities associated with specific products, which can provide a way to glean tips on how to use them and to see how each might meet a given need.
- Broader analytics, business intelligence, and reporting platforms that often incorporate visualization capabilities, from vendors including IBM, Oracle, MicroStrategy, Microsoft, SAP, and others. These products can address more complex data platform needs and often provide wide-ranging capabilities but may require more training in order to exploit their full potential. In some cases, IT may need to be looped in to assist in integrating these tools with underlying data and related applications.
- Open-source tools. One of the best known, although certainly not the only one, is D3.js, often referred to simply as "D3" (for "data-driven documents"). It entails the use of a JavaScript library to develop interactive visualizations within websites, such as the interactive maps that newspapers often use to explore election results, demographic trends, and other forms of data-driven journalism. D3 can be useful when the visualization requires complete customization, substantial interactivity, or for developing a framework that allows you to reuse code. It does require a certain level of comfort in coding in JavaScript, and some proficiency in HTML and other languages can be useful in tapping its full potential.

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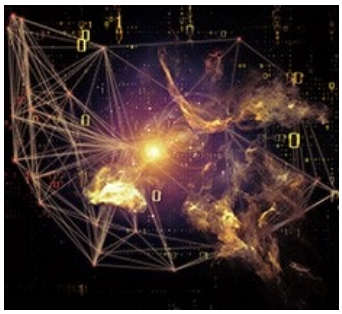
the finance department. But that's not to say that the effort can't misfire. Some common ways that visualization projects go off the rails include:



- **Organizational inertia:** As powerful as data visualization can be, and as compelling as the "speed to value" case may look on paper, it can be difficult to wean people off spreadsheets and tabular reports. Developing the right visualization solution is often a collaborative effort between finance and a given audience, in which both parties come to agree that a more visual presentation of data can result in better insights, faster decisions, or whatever the goal may be.
- **Bad data:** Visualization can yield faster, sharper insights, but only if the data that's being visualized is accurate, complete, and relevant. The old saying "garbage–in, garbage–out" may apply here, so before generating even a simple chart, the person or people assigned to a visualization project need to be confident that they are working with the right data.
- **Poor design:** This can cut both ways: in some cases, an overzealous employee may produce visualizations that are too clever by half, overstuffed with charts and interactivity that hamper rather than help the user. Worse, poor design can result in "false positives," as visualizations serve up analysis that is fundamentally flawed due to a variety of underlying data issues. In other cases, the effort can fall flat: pie charts have their uses, but as visualization becomes more common, it behooves anyone involved to learn the nuances regarding charts that address comparisons, relationships, distribution, and composition.

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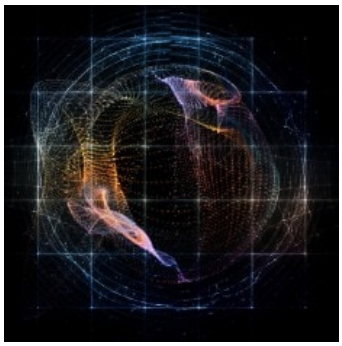
The big picture



Data visualization may be less a core technology than a method of amplifying the impact of the technologies that drive reporting, analytics, and other data–crunching efforts, but don't confuse "complementary" with "ancillary." That ability to amplify—and clarify—key metrics and other financial and non–financial data is crucial, both for data-driven insights and finance's ability to partner more effectively across the organization.

Moreover, given the ever-expanding trove of information being generated (think social–media postings or the sensor–generated data derived from the Internet of Things), data visualization may be key to filtering and distilling such information in real time. Gaining that competitive edge doesn't have to be an arduous process either: Organizations may find that they can progress quickly, from rudimentary pilots designed to help a small group of end users sees relevant data points more clearly, to powerful forms of data visualization that provide interactive features that enhance the ways in which more data-savvy analysts and other users explore and exploit data.

In short, data visualization can greatly improve finance's ability to tell stories. And as senior finance leaders strive to do more with their data, tapping the power of data visualization may also allow the rest of the organization to better understand the power of finance.

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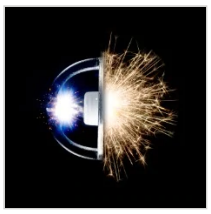

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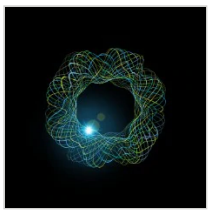

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